

8.12 Transportation-Related Comments on the Supplement to the Draft EIS

8.12 (224)

Comment - 11 comments summarized

Commenters stated that the flexible design includes the capability for handling younger, hotter fuel, and questioned whether the transportation impacts of fuel blending were adequately addressed in the Supplement to the Draft EIS. They believe shipping hotter fuel would cause increased radiation exposure to those along transportation routes, to workers, and to those exposed to an accident. Commenters stated that shipping younger fuel would invalidate accident analyses in the Draft EIS and that the Supplement should have contained a risk assessment for this fuel.

Commenters stated that the Supplement should have contained a description of the shipping campaign, including the specific timing, number, and composition of the shipments, and a description of the national routes DOE would use to transport the material. Commenters expressed concern that fuel blending and shipping younger fuel could eliminate the advantages of using rail transportation.

Response

If DOE shipped younger (and therefore hotter) spent nuclear fuel than that assumed for the analysis in the Draft EIS, estimates of public and occupational health and safety impacts would be greater than those reported in the Draft. However, DOE developed the flexible design for the repository to allow flexibility in the emplacement of spent nuclear fuel and high-level radioactive waste that DOE projects it would receive, not to promote or accommodate receipt of younger, hotter spent nuclear fuel. The estimated quantities and characteristics (for example, years following discharge from a reactor) of receipts were based on DOE projections of actions that would be taken by utilities to deliver spent nuclear fuel for disposal. The projections are independent of the repository design. Rather, they are based on the terms of DOE's Standard Contract for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste contained in 10 CFR Part 961 and the generation and storage characteristics of each generator site (see discussion of CALVIN computer code in Section J.1.1.1 of the EIS). DOE does not anticipate that the flexible design would have any effect on the characteristics of spent nuclear fuel that would be shipped to a Yucca Mountain Repository or, consequently, on the casks and modes of transport that would be used for shipment. Therefore, DOE does not expect that the health and safety risks of transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain, or the consequences of maximum reasonably foreseeable transportation accidents would be different for the flexible design from those associated with the design presented in the Draft EIS.

Nevertheless, in response to public comments on the Draft EIS concerning the age and burnup assumed for spent nuclear fuel used in accident analyses, DOE reevaluated the characteristics of spent nuclear fuel that it would receive. As a result of this reevaluation, DOE determined that the accident hazard for spent nuclear fuel with a cooling time of 15 years for pressurized-water reactor fuel assemblies and 14 years for boiling-water reactor fuel assemblies represents the midpoint of the cumulative hazard of all spent nuclear fuel that would be shipped. As a consequence, analyses of accidents presented in the EIS use the characteristics of "representative" spent nuclear fuel described in Appendix A of the EIS. The projected average age of spent nuclear fuel delivered to a repository would be that described for "typical" spent nuclear fuel in Appendix A.

The Draft EIS discussed ongoing site characterization activities and design evaluations, and the potential for resulting changes to the design. Since the publication of that document, DOE acquired an improved understanding of the interactions of repository features with the natural environment, and the advantages of a number of design features (such as titanium drip shields) to enhance containment and isolation. DOE published the Supplement to the Draft EIS to provide the updated information to the public. While aspects of the design evolved from those in the Draft EIS, the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain (such as transportation of spent nuclear fuel and high-level radioactive waste) remain unchanged. For this reason, the Supplement focused on the most recent design enhancements, including various repository operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

If there was a decision to proceed with the development of a repository at Yucca Mountain, shipping routes would be identified at least 4 years before shipments began and NWSA Section 180(c) assistance would be made available

approximately 4 years prior to shipments through a jurisdiction. At this time, many years before shipments could begin, it is impossible to predict with a reasonable degree of accuracy which highway routes or rail lines could be used. In the interim, states or tribes could designate alternative preferred highway routes, and highways and rail lines could be constructed or modified. Therefore, for purposes of analysis in this EIS, DOE identified representative highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (Interstate System highways, beltways, or bypasses, and state or tribal designated alternate routes) that reduce time in transit. Rail lines were identified based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for the shipment of radioactive materials.

Because the Yucca Mountain site has not been approved for construction and operation of a geologic repository, DOE has not developed operations plans for transportation. However, a Draft Request for Proposals for *Acquisition of Waste Acceptance and Transportation Services for the Office of Civilian Radioactive Waste Management* (DIRS 153487-DOE 1999) describes the Department's schedules and plans for acquiring services to transport spent nuclear fuel and high-level radioactive waste to a Yucca Mountain Repository (see Appendix M of the EIS).

In response to public comments, DOE has included in the EIS maps of representative highway routes and rail lines that were used for analysis. In addition, potential health and safety impacts associated with shipments are provided for each state through which shipments would pass.

8.12 (251)

Comment - 10 comments summarized

Commenters recognized that, because of the flexible design, the Supplement to the Draft EIS indicates an increased number of worker- and material-related transportation fatalities. Some commenters questioned the validity of the analytical results, and others asked that the analyses be incorporated into the Final EIS along with mitigation strategies. Several commenters expressed concern that the short-duration campaign to ship drip shields to the repository, currently planned for the time near repository closure, is not adequately addressed.

Response

To estimate the number of traffic-related fatalities that would occur in the course of worker commuting and transportation of materials, supplies, and wastes to and from a Yucca Mountain Repository, DOE used the latest reasonably available information compiled from U.S. Department of Transportation statistics. For example, the Bureau of Transportation Statistics reports that about 1 traffic fatality occurs for each 100 million kilometers (62 million miles) of travel on U.S. highways. A fatality rate of 1.4 fatalities per 100 million kilometers is the average of state-specific values used in the EIS for heavy-haul trucks. This value was compiled from data from the Department of Transportation.

The impacts of transporting drip shields to Yucca Mountain are included in analyses of impacts of transporting other materials and personnel in Section J.3.6 of the EIS. Estimated transportation impacts would be the same whether the drip shields were transported for emplacement over the full duration of the emplacement phase or over a period of 1 or 2 years near the end of emplacement, because:

1. The number of railcar and truck shipments and the distance shipped would be the same.
2. The analysis of transportation impacts is based on rate data (per kilometer of travel) for accidents and fatalities. These data were derived from national transportation statistics. Shipments of drip shields, even if compressed into 1 or 2 years, would not be discernible from the total transportation of all commodities on U.S. highways and railroads and, therefore, would not be expected to affect accident or fatality rates.

In addition, because shipments of drip shields from manufacturers to Yucca Mountain would use commercial transportation carriers operating under U.S. Department of Transportation and applicable state safety regulations, the expected rate for involvement in accidents would be the same as for other commodities.

8.12 (10971)

Comment - EIS010158 / 0007

As other people have said, the SDEIS doesn't present qualitative or quantitative studies of the various accident scenarios. Studies must be conducted and presented to the public. How would a crack in the fuel column, accidents

along transportation routes, mislabeling, as people have said of packages, of the waste packages, how the Alloy 22, which is my age, how are all these things going to play out in the long run?

Response

The Draft EIS discussed ongoing site characterization activities and design evaluations, and the potential for resulting changes to the design. Since DOE issued the Draft EIS, it has acquired an improved understanding of the interactions of repository features with the natural environment, and the advantages of a number of design features (such as titanium drip shields) to enhance waste containment and isolation. DOE published the Supplement to the Draft EIS to provide the updated information to the public. While aspects of the design have evolved from those in the Draft EIS, the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain (such as transportation of spent nuclear fuel and high-level radioactive waste) remain unchanged. For this reason, the Supplement focused on the most recent design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

In the Draft EIS DOE considered six categories of increasingly severe and increasingly unlikely accident scenarios. The analyses hypothesized one accident scenario to represent each category, along with a corresponding projection of the amount of radioactive material that could be released from a transportation cask. The analyses estimated impacts of postulated releases in three population zones – urban, suburban, and rural – and under two weather conditions – slowly dispersing conditions and moving-air conditions. The analyses also estimated the impacts from an unlikely but severe accident scenario called a maximum reasonably foreseeable accident. In response to public comments and to clarify this discussion for the reader, DOE has revised the EIS to describe the maximum reasonably foreseeable accident in terms of cask failure mechanisms, range of impact velocities, and temperature range for the accident.

Based on the revised analyses, DOE has concluded in the EIS that casks would continue to contain spent nuclear fuel fully in more than 99.99 percent of all accidents (of the thousands of shipments over the last 30 years, none has resulted in an injury due to release of radioactive materials). This means that of the approximately 53,000 truck shipments, there would be an estimated 66 accidents, each having less than a 0.01-percent chance that radioactive materials would be released. The chance of a rail accident that would cause a release from a cask would be even less. The corresponding chance that such an accident would occur in any particular locale would be extremely low. Section J.1.4.2.1 of the EIS presents consequences for accidents that could release radioactive materials.

Section 2.3.4.1 of the Supplement to the Draft EIS discusses the construction of the flexible design waste package, which includes an Alloy-22 shell. This package would contain the waste for emplacement within the proposed repository and is not the cask that would be used for transportation to the Yucca Mountain site. The NWPA requires DOE to use transportation casks certified by the Nuclear Regulatory Commission when transporting spent nuclear fuel and high-level radioactive waste to a repository.

8.12 (12708)

Comment - EIS010485 / 0007

While, according to the Supplement, “Transportation of spent nuclear fuel and high-level radioactive waste to the repository would not be affected by the repository design evolution and is not evaluated in this Supplement,” the DOE should disclose the growing resistance to shipping nuclear waste throughout the country in the Supplement.

Response

DOE published the *Supplement to the Draft Environmental Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* to provide the updated design information to the public. While aspects of the design evolved from those in the Draft EIS, the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain (including transportation of spent nuclear fuel and high-level radioactive waste) remain unchanged. For this reason, the Supplement focused on the most recent design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

Chapter 6 and Appendix J of the EIS contain information on transportation-related impacts that could result from the Proposed Action. These analyses used widely accepted analytical tools, latest reasonably available information, and

cautious but reasonable assumptions that offer the most appropriate means to arrive at conservative estimates of transportation-related impacts. In addition, because of the public's interest in transportation in general and in the related information and analyses, the Department has included in the EIS descriptive information such as a new Appendix M and maps and tables that show the analyzed routes and estimated health and safety impacts for each state through which the shipments would pass. Appendix M provides general background information about transportation-related topics, such as transportation operations, cask testing requirements, and emergency response.

DOE has considered all comments received on the Draft EIS, as well as all comments received on the Supplement to the Draft EIS, and responded to them in this Comment-Response Document, including those that address concerns with shipping spent nuclear fuel and high-level radioactive waste. The Secretary of Energy will make a determination on whether to recommend the site to the President on the basis of a number of different types of information, including that contained in the Final EIS. Any recommendation of the site to the President by the Secretary of Energy would be accompanied by the Final EIS.

8.12 (13080)

Comment - EIS010230 / 0006

The low-temperature scenario is intended to improve the long-term performance of the repository and reduce geologic uncertainties, but would result in greater transportation risks, including a higher traffic fatality rate, due to an increased distance/number of shipments to the repository. The SDEIS should offer mitigation measures to help minimize the increased transportation risk.

Response

DOE believes that the risks of transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain would be very small for the Proposed Action, regardless of the eventual repository design. The transportation activities under the lower-temperature repository operating mode would be similar to the other repository scenarios. The distances and number of shipments to the repository would not change. Therefore transportation risks would not be greatly different. If the Yucca Mountain site was selected, DOE would enter into discussions with potentially affected units of local government and consider appropriate support and mitigation measures.

8.12 (13082)

Comment - EIS010230 / 0008

In Section 3.1.14, "Transportation," the SDEIS states that "transportation of spent nuclear fuel and high-level radioactive waste to the repository would not be affected by the repository design evolution." It is impossible to predict whether transportation would be affected because the design has not been finalized. Therefore, the relationship of design evolution to transportation parameters is unknown.

Response

The Draft EIS discussed ongoing site characterization activities and design evaluations, and the potential for resulting changes to repository design. Since DOE issued the Draft EIS, it has acquired an improved understanding of the interactions of repository features with the natural environment, and the advantages of a number of design features (such as titanium drip shields) to enhance waste containment and isolation. DOE issued the Supplement to the Draft EIS to provide the updated information to the public. While aspects of the design have evolved, the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain (such as transportation of spent nuclear fuel and high-level radioactive waste) remain unchanged. For this reason, the Supplement focused on the most recent design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

DOE believes, however, that the EIS adequately analyzes the potential environmental impacts that could result from the Proposed Action. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts, and the use of bounding assumptions where information is incomplete or unavailable, or where uncertainties exist. The use of widely accepted analytical tools, latest reasonably available information, and cautious but reasonable assumptions offer the most appropriate means to arrive at conservative estimates of transportation-related impacts.

8.12 (13225)

Comment - EIS010244 / 0024

Figure 2-4 of the SDEIS refers only to direct rail access and heavy-haul access to the site. The text on page 2-12 refers to legal weight trucks. It is not clear if DOE anticipates legal-weight trucks being used to transport waste directly to the Yucca Mountain site.

Response

DOE has incorporated Figure 2-4 of the Supplement to the Draft EIS into the Final EIS and modified it to clarify that legal-weight trucks and either railcars or heavy-haul trucks would have access to the site.

8.12 (13277)

Comment - EIS10231 / 0011

Page 3-17, Section 3.1.14. Transportation. We note that the transportation impacts are increased for the flexible design over the draft EIS design. These increased impacts, as well as those noted in other areas, should be incorporated into the final EIS analysis.

Response

The flexible design presented in the Supplement to the Draft EIS was carried forward to the Final EIS analyses.

REFERENCES

- | | | |
|--------|-------------------------|--|
| 154675 | Ahmer 1998 | Ahmer, D. 1998. <i>Cost Estimate for the Heavy Haul Truck Transport Design</i> . EIS AR-TR-80036. [Las Vegas, Nevada: Morrison Knudsen Corporation]. ACC: MOL.19981207.0257 |
| 102043 | AIWS 1998 | AIWS (American Indian Writers Subgroup) 1998. <i>American Indian Perspectives on the Yucca Mountain Site Characterization Project and the Repository Environmental Impact Statement</i> . Las Vegas, Nevada: Consolidated Group of Tribes and Organizations. ACC: MOL.19980420.0041 |
| 101482 | American Cancer Society | American Cancer Society 1998. <i>Cancer Facts and Figures – 1998</i> . Atlanta, Georgia: American Cancer Society. TIC: 242284. |
| 156289 | ANSI 1987 | ANSI (American National Standards Institute) 1987. <i>American National Standard for Truckload Quantities of Radioactive Materials - Carrier and Shipper Responsibilities and Emergency Response Procedures for Highway Transportation Accidents</i> . ANSI N14.27-1986. New York, New York: American National Standards Institute. TIC: 1495. ACC: QC |
| 103072 | Ardila Coulson 1989 | Ardila Coulson, M.V. 1989. <i>The Statewide Radioactive Materials Transportation Plan</i> . Phase II. Reno, Nevada: University of Nevada, Reno. TIC: 222209. |
| 106860 | AREA 1997 | AREA (American Railway Engineering Association) 1997. <i>Track</i> . Volume 1 of <i>Manual for Railway Engineering</i> . Washington, D.C.: American Railway Engineering Association. TIC: 233847 |
| 103074 | BEA 1992 | BEA (Bureau of Economic Analysis) 1992. <i>Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)</i> . BEA REA 92-01. 2nd Edition. Washington, D.C.: U.S. Department of Commerce. ACC: MOL.20010721.0028. |